Red foxes are invading high arctic ecosystems and could represent an important threat to arctic foxes. A better understanding of the requirements of each species and a monitoring of this community is essential in the context of a warming climate.

Introduction

Recent changes in climate have influenced the distribution of many species around the globe. Species inhabiting arctic ecosystems may be particularly affected by these changes considering that possibilities for retreat to the North are limited. During the last century, the red fox has invaded many northern ecosystems and is now occupying an important part of the arctic fox range of distribution.

Since arctic foxes are one of the main terrestrial predators in the Canadian Arctic, and overlap between the ecological niche of the two species is high, the arrival of this new competitor may influence considerably the life history of the arctic fox. In Fennoscandia, the increasing abundance of red foxes has been an important factor in the near extinction of arctic fox populations. Access to a den site is an important dimension of the ecological niche of the two species since they are required for reproduction. Considering their limited availability in the arctic tundra, dens can thus become an important source of conflict between the two species.

Objectives

1) To determine the current status of the fox community on Bylot island, and establish a monitoring protocol in collaboration with Sirmilik Canada national park.

2) To better understand the processes leading to den site choice by arctic foxes and identify characteristics selected when choosing a den site.

Methods

Status of the fox community

We conducted an exhaustive den survey on the south plain of Bylot island (350 km² area) during summer 2003. Each den found (n=100) is now visited every summer to identify dens used for reproduction, number of litters and average litter size for each fox species.

Den site selection

The importance of topography, microclimate and distribution of food resources was evaluated at 3 different scales:

A) Study area (comparison of den sites with random sites in the study area)

B) Micro-habitat (comparison of den sites with potential sites in a 100m radius)

C) Among dens (comparison of reproductive and non-reproductive dens)

Results

Status of fox community

- Out of the 100 identified dens, only 1 has been used by red foxes for reproduction compared to 29 by arctic foxes.

- Number of litters and litter size is closely linked with lemming abundance on the island.

Den site selection

- At the scale of the study area:
  - Arctic foxes select sites on ridges or slopes (p<0.001) with early snowmelt (p<0.001) and close to an important food patch (p<0.001) but usually avoid slopes with a northern orientation (p=0.001).

- At a smaller scale (inside a 100m radius):
  - Steepest slopes (p<0.001) with low snow cover at spring (p<0.001), situated on a sandy and deeper substrate (p<0.001) are preferred by arctic foxes.

- Among available dens:
  - Those at higher altitude (p<0.001) and farther away from the food patch (p<0.001) are preferred for reproduction purpose.

Conclusion

- Abundance of red foxes is still low on Bylot island but their choice of a reproductive dens seems to be similar to that of arctic foxes.

- Monitoring of the fox community is therefore essential to detect potential impacts on arctic fox populations.

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